Duodenocaval fistula as a result of a fish bone perforation

Daniel Brandão, MD, MMSc, Alexandra Canedo, MD, Miguel Maia, MD, Joana Ferreira, MD, and **Guedes Vaz, MD,** *Vila Nova de Gaia, Portugal*

Duodenocaval fistula is a rare and potentially lethal condition. We report a case of a 61-year-old female with a duodenocaval fistula resulting from a fish bone perforation of the duodenum who survived with conservative treatment. To our knowledge, this is the first reported case of a duodenocaval fistula caused by a fish bone. Additionally, besides revising the other possible etiologies for duodenocaval fistulae, we also discuss its diagnosis and treatment. (J Vasc Surg 2010;51:1276-8.)

Duodenocaval fistula (DCF) is a life-threatening condition that may rarely occur because of the proximity of the duodenum and inferior vena cava (IVC). Accordingly, we report a singular case of a DCF due to an ingested fish bone.

CASE REPORT

A 61-year-old, non-alcoholic, denture-wearing woman was admitted with complaints of fever, abdominal pain, persistent vomiting, and dyspnea for 3 days. Her medical history was positive for medication-controlled hypertension and type 2 diabetes mellitus with no evidence of previous peptic ulcer disease or intra-abdominal intervention. Vital signs were: pulse, 119/minute; blood pressure, 80/45 mm Hg; temperature, 37.7°C. She was tachypneic and dehydrated. Bilateral rales were noted in pulmonary auscultation. Her abdomen was slightly painful in the upper quadrants but soft with no palpable mass detected. Laboratory tests showed: white cell count, 14.800/mL; serum creatinine, 1.5 mg/dL; C-reactive protein, 183.4 mg/L. Arterial blood gases were pH 7.45; PO_2 47 mm Hg; PCO_2 38 mm Hg. A computed tomography (CT) scan was performed, but no evidence of a septic source from the thorax, abdomen, or pelvis was originally found. Initial blood cultures were negative. The echocardiogram was negative for endocarditis. Supportive measures were started. The patient became more stable, but septic signs persisted despite initial piperacillin/tazobactam empirical administration. A CT scan was repeated 6 days after admission. Unexpectedly, a DCF was identified as a result of a fish bone perforation; partial thrombosis of the IVC caudal to this point was also observed (Fig 1). At that time, blood cultures became positive for *Gemella morbillorum*, a seldom pathogenic, facultative anaerobic Gram-positive *coccus*, commensal of the gastrointestinal tract, which appeared sensitive to imipenem. Anticoagulation was started, and antibiotherapy was changed to imipenem. Retrospectively, the patient was found to have a diet rich in fish. A CT scan performed 18 days after admission showed persistence of limited thrombus inside the IVC with the absence of the foreign body initially detected, which apparently had migrated to the transverse colon (Fig 2). No pulmonary or cardiac embolization was detected. An echocardiogram was repeated, but no evidence of any foreign body, vegetations, or structural cardiac damage was observed. No gastrointestinal bleeding was ever noticed. The patient maintained a stable hemoglobin level over time. After a 15-day period of sustained defervescence, negative blood cultures, and a total of 24 days since admission, the patient was discharged with oral anticoagulation and periodically revaluated in the outpatient clinic. She remained symptom-free, with no evidence of infection in the laboratory tests after 2-year follow-up. CT scans completed 3 and 12 months after discharge demonstrated complete resolution of the thrombus and absence of any foreign body. Anticoagulation was withdrawn after the last CT scan.

DISCUSSION

DCF is rare with only 39 cases previously reported in English literature.[1] This highly lethal condition characteristically arises as a complication from trauma, resection of a retroperitoneal tumor with adjuvant radiotherapy, or peptic ulcer disease.[1,2] Trauma can result from a penetrating abdominal injury, an IVC filter, or the transmural migration of an ingested foreign body.[2] Toothpicks and chicken bones have been reported as causative swallowed items of DCF, yet this case is the first to be described consecutively with a fish bone perforation.[1,3,4]

Digestive tract perforation from an ingested foreign body is rare. It has been estimated that 80% to 90% will pass uneventfully, and only less than 1% will result in perforation.[5,6] Drug and alcohol abuse, rapid eating, extremes of life, and wearing of dentures have been described as risk factors for accidental foreign body ingestion.[7,8]

The diagnosis of DCF poses a medical challenge. The classic presentation of a fistula between the digestive tract and the vascular tree is a septic syndrome associated with digestive bleeding. Yet, this association has only been identified in 45% of patients with DCF.[2] These signs are more

From the Department of Angiology and Vascular Surgery Department, Vila Nova de Gaia/Espinho Hospital Center, Vila Nova de Gaia.

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Reprint requests: Daniel Brandão, MD, MMSc, Serviço de Angiologia e Cirurgia Vascular, Centro Hospitalar de Vila Nova de Gaia/Espinho, Rua Conceição Fernandes, 4434-502 Vila Nova de Gaia, Portugal (e-mail: jdanielbrandao@gmail.com and dbrandao@med.up.pt).

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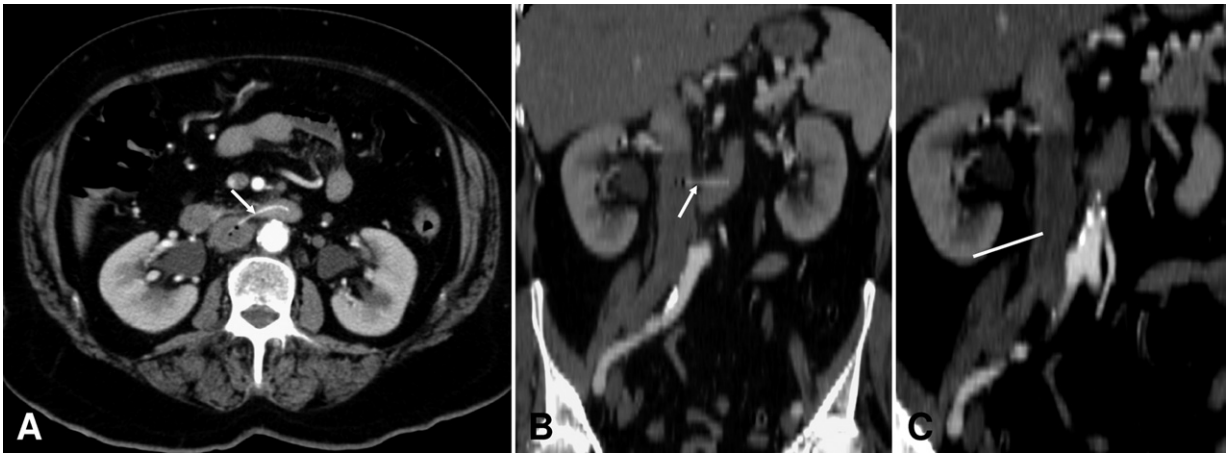

Fig 1. A and **B,** cross-sectional and coronal reconstruction CT scan demonstrating a duodenocaval fistula resulting from an arciform fish bone perforation (*white and black arrows*); bubbles of gas can be noted inside the inferior vena cava. **C**, coronal reconstruction CT scan showing partial thrombosis of IVC (*white line*).

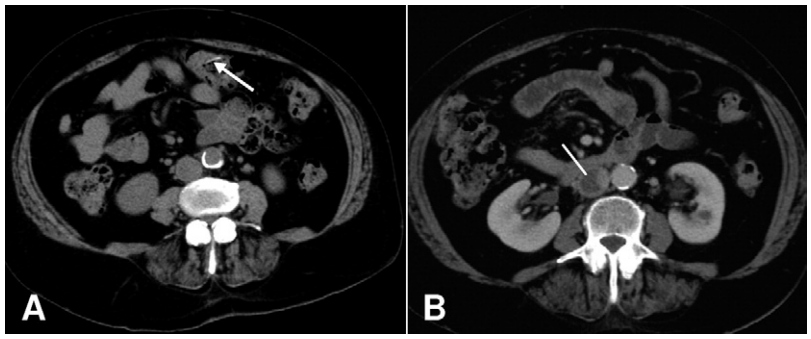

Fig 2. A, cross-sectional CT scan showing the apparently migrated fish bone inside transverse colon (*white arrow*). **B,** cross-sectional CT scan demonstrating partial thrombosis of the IVC (*white line*).

often not concomitantly present and can range from isolated fever to lethal septic shock and from occult blood in the stool to lethal hypovolemic shock.[2,9] Because symptoms and signs are nonspecific, diagnosis of DCF has been established based on endoscopic, radiologic, surgical, and frequently postmortem findings.[2,4,9] A CT scan appears to be effective in detecting intra-abdominal fish bones. Its accuracy can be up to 100%, being dependent, however, on the slice thickness and the observer awareness, as fish bones can be easily missed or mistaken for another structure.[8,10] Meanwhile, in a literature review of 38 cases who specifically developed DCF, CT scans have led to an accurate diagnosis in only 50% of patients.[8-10] The presence of thrombus and gas in the IVC lumen associated with an incarcerated foreign body should lead to the diagnosis of DCF.[2,9,11] Yet, those findings are most frequently not simultaneously present or not present at all, limiting the accuracy of a CT scan for DCF diagnosis. Another finding that should increase suspicion is the observation of a periduodenal abscess.[2] Additionally, DCF has been indirectly revealed in one case by showing hyperdense hepatic and splenic images as a result of venous passage of oral contrast.[12] IV contrast can be useful in clarifying the presence of IVC thrombosis.[11] However, both oral or IV contrast can cause additional difficulties in identifying small foreign bodies.[10] Herein, the correct identification of a DCF was only achieved after the completion of a second CT scan. This may be explained by the fact that the first two CT scans were obtained with standard 5-mm slice thickness. To limit the inaccuracy of detecting a potential migration of the slim fish bone, subsequent CT scans were performed with thinner sections (3 mm). According to Perera et al,[9] the others diagnostic modalities used are even less accurate than a CT scan: contrast swallow radiography, 38%; cavography, 33%; endoscopy, 30%. An ultrasound scan appears to be sensitive in detecting hyperreflective foreign bodies, but performances are significantly conditioned by obesity, operator skills, and location of the intestinal perforation.[4] Consequently, an ultrasound scan was only described to have been effective in detecting DCF in 2 patients.[4] It results that a thin-section CT scan should be the first test to be performed when DCF is suspected.

When an antemortem DCF diagnosis is obtained, patients are most probably septic and unstable, leading to

prompt surgery. The technique to be used depends on the injury extension to the duodenum and to the IVC. The subjacent mechanism and the presence of IVC thrombosis can also influence the surgical option. Most authors prefer simple suture of the duodenum and IVC usually with surgical measures to prevent recurrence of the fistula, such as an epiploic or jejunal patch.[2,9] Truncal vagotomy, antrectomy, and/or duodenal exclusion have also been adjunctly performed, particularly in DCF caused by a peptic ulcer.[2] Pancreaticoduodenectomy with gastrojejunostomy plus choledochojejunostomy and division or excision of the IVC with or without graft interposition have also been described.[2,9] Guillem et al[2] reported a 61% morbidity rate after surgery. The overall mortality for DCF reaches 39.5%.[9] Considering these facts, the relative stability of the patient and the positive response to antibiotics, we decided to maintain a conservative treatment, leaving surgery for a hypothetical worsening of septic condition. The favorable evolution observed was concomitant with an apparent migration of the fish bone to the colon associated with a modification of therapeutic measures. After the impactation of the fish bone in the duodenum as a part of the alimentary chyme, the fish bone was able to perforate the duodenum and IVC creating a communication between both structures and leading to the development of a DCF. Meanwhile, it seems that intestinal peristalsis has been able to progressively remove it from the duodenal wall and propel it through the intestinal lumen. Subsequently, the DCF apparently healed spontaneously, which is in accordance with the favorable evolution of the septic condition and the CT scan findings. Additionally, no migration of the fish bone to the heart or the lungs was identified, which could have led to perpetuation of a septic state.[13-15] Due to the presence of a presumed infected thrombus inside the IVC, imipenem was maintained until a period of consistent defervescence was obtained.

This singular case of DCF is, to our knowledge, the first to be reported resulting from a fish bone perforation. The favorable evolution of the patient with conservative treatment and the apparent migration of the fish bone were quite surprising, which may point to the possibility of an initially more expectant medical treatment in stable patients.

REFERENCES

1. Moran EA, Porterfield JR Jr, Nagorney DM. Duodenocaval fistula after irradiation and resection of a retroperitoneal sarcoma. J Gastrointest Surg 2008;12:776-8.
2. Guillem PG, Binot D, Dupuy-Cuny J, Laberenne JE, Lesage J, Triboulet JP, Chambon JP. Duodenocaval fistula: a life-threatening condition of various origins. J Vasc Surg 2001;33:643-5.
3. Schwartz JT, Graham DY. Toothpick perforation of the intestines. Ann Surg 1977;185:64-6.
4. Rioux M, Lacourcière L, Langis P, Rouleau M. Sonographic detection of ingested foreign bodies in the inferior vena cava. Abdom Imaging 1997;22:108-10.
5. Maleki M, Evans WE. Foreign-body perforation of the intestinal tract. Report of 12 cases and review of the literature. Arch Surg 1970;101: 475-7.
6. McCanse DE, Kurchin A, Hinshaw JR. Gastrointestinal foreign bodies. Am J Surg 1981;142:335-7.
7. Pinero Madrona A, Fernández-Hernández JA, Carrasco Prats M, Riquelme Riquelme J, Parrila Paricio P. Intestinal perforation by foreign bodies. Eur J Surg 2000;166:307-9.
8. Coulier B, Tancredi MH, Ramboux A. Spiral CT and multidetector-row CT diagnosis of perforation of the small intestine caused by ingested foreign bodies. Eur Radiol 2004;14:1918-25.
9. Perera GB, Wilson SE, Barie PS, Butler JA. Duodenocaval fistula: a late complication of retroperitoneal irradiation and vena cava replacement. Ann Vasc Surg 2004;18:52-8.
10. Goh BK, Tan YM, Lin SE, Chow PK, Cheah FK, Ooi LL, Wong WK. CT in preoperative diagnosis of fish bone perforation of the gastrointestinal tract. AJR Am J Roentgenol 2006;187:710-4.
11. Allen B, Krupski WC, Wylie EJ. Toothpick perforation of the inferior vena cava. West J Med 1983;138:727-30.
12. Vitellas KM, Stone JA, Bennett WF, Mueller CF. The hyperdense liver and spleen: a CT manifestation of barium embolization through a duodenocaval fistula. AJR Am J Roentgenol 1997;169:915-6.
13. Fry SJ, Picard MH, Tseng JF, Briggs SM, Isselbacher EM. The echocardiographic diagnosis, characterization, and extraction guidance of cardiac foreign bodies. J Am Soc Echocardiogr 2000;13:232-9.
14. Karam AR, Hourani MH, Al-Kutoubi AO. Catheter fracture and migration into the coronary sinus – an unusual migration site: case report and review. Clin Imaging 2009;33:140-3.
15. Lacroix S, Ferland A, Gilbert P, Lemieux M, Bilodeau L, Poirier P. Cardiac hazard associated with eating habits. A case of infected intrapericardial foreign body due to an ingested toothpick. Can J Cardiol 2009;25:e263-4.

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